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International Economic Analysis
and Prospects

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Scenarios for Growth in the 1990s

Shahrokh Fardoust
and
Jian-Ping Zhou

The long-term economic prospects for developing countries will be affected by changes in the international economic environment but depend ultimately on the success or failure of their domestic policies.

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Using two macroeconomic models (the Bank's GEM/CFM and the International Monetary Fund's MULTIMOD) and results from the OECD's INTERLINK model, Pardoust and Zhou simulate global outcomes in the 1990s under several scenarios, allowing for the impact of:

- Changes in industrial countries' financial and macroeconomic conditions.

- Changes in the international oil market.

- Changes in developing countries' domestic policies under varying assumptions about the world economy and trading environment.

They find that an increase in the growth rate in industrial countries has an unambiguously positive effect on the growth rate in developing countries, but that the magnitude of the impact depends largely on the level of real international interest rates. To an extent, low real interest rates together with continuing financial flows to the developing countries could cushion the negative impact on developing countries of the recession in industrial countries.

The authors' simulations reinforce the argument that developing countries' domestic policies play a crucial role in determining long-run growth, inflation, and interest rates. They find, for example, that if external conditions remain unchanged, reasonable improvements in domestic policies (specified in the paper) can increase developing countries' average growth by about 1.5 percentage points a year.

The simulation results show that as world oil prices become more volatile, so do world inflation, interest, and GDP growth rates. The results also show the superiority of non-debt-creating flows (for example, foreign direct investment) to debt-creating, interest-sensitive flows to developing countries, in terms of long-term sustainable growth.

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CONTFNTS

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1. INTRODUCTION

Where is the world economy heading in the decade of the 1990s? Although, the ongoing process of global economic integration is likely to continue unabated, in view of a large number of important economic and political changes that are taking place worldwide, it is not clear how various regions or countries will fare in the global economy by the end of this century. Will Japan and Western Europe overtake North America in terms of living standard, or economic and financial clout? How would the economic and political transformations in Eastern Europe, or the massive changes in the Soviet Union, affect international trade and financial flows? And, how will the developing countries be affected by these global developments? Will these countries, a large majority of which experienced low or no growth during the 1980s, be able to resume growth and development in the 1990s? These are difficult questions to answer, particularly at the present juncture. This is partly because there is a great deal of uncertainty concerning the evolution of international trade and financial flows in the 1990s, and partly due to the possibility that the traditional real and financial linkages between regions or countries may themselves be changing. Moreover, as far as the outlook for developing countries is concerned, an additional (perhaps the most important) source of uncertainty is their own domestic policies. The main question is to what extent will the developing countries as a group be successful in implementing the needed policy reforms and structural changes during the 1990s?

Looking ahead, over the next several years, there are both positive and negative aspects to the major changes that are currently taking place in the world economy. On the positive side, there is a wide-spread economic and political reform on several fronts: a serious attempt to liberalize world trade in goods and services, a major program for market unification and monetary union in western Europe, detente among the super-powers that could slow the arms race, economic transformation of Eastern Europe and its integration in the international economy, and the rapid pace of technological progress. These events, together hold a lot of promise and opportunities for growth and prosperity in the 1990s and beyond. But, there are also a number of short- and medium-term imponderables. The substantial volatility in oil prices in 1990-91 demonstrated how vulnerable the world economy in general, and developing countries in particular, are to major adverse shocks. There is considerable financial volatility in the world economy, as portfolios of some of the biggest banks and insurance companies in the United States and Japan have been weakened by a large number of defaults in the non-financial sector and, the 1990 plunge and current volatility of equity prices. There are fears of an impending shortage of international capital that could drive up international real interest rates. A number of major industrial countries were in

recession early this year, and their recovery could be slow and weak. Because of a large divergence in the present negotiating position of the United States and the European Community, particularly in the area of agriculture, the Uruguay Round of negotiations for liberalizing world trade could fail. There are signs that if these negotiations collapse, the risk becomes far greater that existing regional trading blocs will turn protectionist.

Obviously, trying to quantify the economic effects that may be emanating from occurrence of any of these events, either positive or negative, on the long-term growth prospects of industrial and developing countries is both difficult and highly speculative. This is mainly because neither the timing nor the exact transmission mechanism of any of these events are known with much certainty. And, perhaps more importantly, some of the traditional real and financial linkages between the developing and industrial countries may have been changed starting in the 1980s[1/] These issues notwithstanding, attempts have been made to quantify various scenarios for international economic environment, and its effect on growth and development in the 1990s, in the recent issues of World Bank's annual publications such as the World Development Report, and Global Economic Prospects paper as well as the IMF's World Economic Outlook and other reports[2/].

The main purpose of this brief note is to try to verify and in some cases critically assess the quantitative results of a selected scenarios for the 1990s that are of importance to the developing countries using alternative models. The scenarios considered below in this paper are:

- financial stress in Japan and the United States;
- the U.S. budget deficit and its effect on world savings and interest rates;
- volatility of oil prices;
- protectionism and regional trade blocs; and
- high and low productivity growth scenarios for the world economy.

The models used for this purpose are the Bank's GEM/CFM model, and the IMF's MULTIMOD model. In some instances, published simulation of results from the OECD's INTERLINK model as well

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1/ See, for example, Louis Emmerij (ed.), One World or Several?, OECD, Paris, 1989.

2/ For example, see World Bank, World Development Report 1991, forthcoming; World Bank, International Economics Department, "Global Economic Prospects and the Developing Countries, 1991", International Economics Department, World Bank, 1991; IMF, World Economic Outlook, October 1990, and April 1991 issues, Washington D.C.; Fardoust and Dhareshwar, A Long-term Outlook for the World Economy Policy and Research Series 12, World Bank, 1990, Washington, D.C.

as some of the private forecasting firms are reported for comparison[3/]. In section 2, we discuss some of the key quantitative issues concerning real and financial linkages between the industrial and developing economies. In section 3, some of the major issues in the 1990s are discussed; and in section 4, the simulation results using alternative models are presented. The last section presents a summary and conclusion of the main findings.

3/ Some of these models are described briefly in Annex 2.

2. REAL AND FINANCIAL LINKAGES

The traditional linkages between industrial and developing countries operate via three main channels: (a) bilateral trade volume (commodities, oil, and manufactures); (b) international trade price links (commodities, oil, and manufactures); and (c) financial links (financial resource flows, international interest rates and exchange rates among the key currencies). It is mainly through these channels that the industrial countries' economic growth as well as their trade and financial policies affect the growth performance of developing countries. There is also a reverse causality. That is, growth in developing countries may affect growth in industrial countries. On the aggregate level, this linkage operates mainly through the level of import demand and prices of commodities (mainly oil) in the developing countries. Despite growing trade and financial linkages over the last 25 years, the impact of the developing country growth on industrial country growth (i.e., the reverse causality) has remained relatively weak. The two most important examples of the reverse causality in recent years are: the sharp rise in import demand in the oil-exporting developing countries in 1974-76 after the first oil price shock, which helped reduce the negative impact of the supply shock in the industrial countries, particularly Western Europe; and the impact of the sharp decline in imports of the severely indebted countries in 1982 which worsened the recession in the industrial countries, particularly the United States.

As shown in Table 1, the magnitude of the impact of the economic slowdown in the industrial countries on the developing countries' growth has changed over the years. The impact of the 1973-75 recession was significantly smaller than the one in 1969-71 mainly because of the sharp rise in lending to developing countries in the 1970s, which was facilitated by the recycling of oil exporting countries' current account surplus. However, because of the debt overhang of the developing countries and high real interest rates in the industrial countries, the impact of the industrial countries' recession on developing countries' growth increased in 1979-82 and 1988-91. One major change that may have taken place in recent years is the tendency of real international interest rates to rise (instead of falling) during periods of slowdown in industrial countries.

The following regression estimates the impact on the GDP growth rate of developing countries of the GDP growth of the industrial countries and international interest rates for the period 1965-88:

$$(1) \quad \underset{}{gyldc} = \underset{(4.3)}{3.192} + \underset{(1.7)}{0.294gyOECD} + \underset{(2.5)}{0.399gyOECD(-1)} - \underset{(1.8)}{0.182Rwrate} - \underset{(0.1)}{0.107Dummy}; \; R^2 = 0.44$$

Table 1. Cyclical changes in Selected Indicators
(percentage points)

Recession (from peak to through)	Change in GDP growth rate of industrial countries (1)	Change in GDP growth rate of developing countries (2)	Change in real LIBOR interest rate a/ (3)	Change in real G-5 interest rate b/ (4)	Ratio (2)/(1)	Ratio (2)/(3)	Ratio (2)/(4)
1969-71: 2 years	-2.4	-2.2	-2.6	n.a	0.91	0.84	n a
1973-75: 2 years	-6.0	-2.1	-4.7	n.a	0.35	0 45	n.a
1979-82: 3 years	-3.5	-2 1	+3.6	+2.4	0.60	1.50	-0.87
1988-91: 3 years c/	-3.0	-1.9	-2.6	+0 8	0.63	0 73	-1.10
average	-3.7	-2.0	1.6	+1.6	0.56	0 13	-0.98

Source: OECD and World Bank data.

a/ Real interest rate in LIBOR (6-month dollar deposits) deflated by U.S. GNP deflator.
b/ Real interest rate is average (unweighted) of G-5 real interest rates, which are defined as LIBOR (6-month local currency deposits) deflated by average G-5 GNP/GDP deflator.
c/ 1991 figures are forecasts from IEC, World Bank

where gyldc = annual rate of GDP growth of low and middle income countries; gyOECD = annual rate of growth of GDP in industrial countries, (-1) = one year lag; Rwrate = world real interest rate (LIBOR; 6-month dollar deposits); Dummy = dummy variable for oil price shocks of 1974 and 1979-80. According to equation (1) nearly 44 percent of variation of GDP growth rate of the developing countries as a group over the period 1965-88 can be explained by changes in the rate of growth of the industrial countries and world interest rate. Although, the coefficient of determination (R^2) is relatively high statistically, most of the variation in growth of developing countries remains unexplained.[4/] After controlling for the cyclical effects of the industrial countries' economic performance the estimated trend (basic) growth rate of developing countries is 3.2 percent a year.

A one percentage point rise in the GDP growth rate of industrial countries raises developing country growth by about 0.7 percentage point after two years (i.e. after controlling for changes in the

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4/ For example, William Cline (in World Inflation and the Developing Countries, the Brookings Institute, Washington, D.C., 1981, pp.242) using 1960-77 data estimates even a weaker relationship:

$$gyldc = 4.67 + 0.230 * gyOECD(-1); \quad R^2 = 0.21.$$
$$(1.9)$$

real interest rate). The change in industrial country growth (and its lagged effect) tends to capture the cyclical effects of trade volume and trade pr ce changes on the developing countries' growth. On the other hand, after controlling for these effects, a 100 basis point rise in world interest rates reduces developing country growth by about 0.2 percentage point. Because of differences in trade structure and linkages as well as in the extent of external indebtedness, the estimated impact of these variables on developing country growth varies significantly across regions. The impact of a change in industrial country growth is largest in Latin America and East Asia, while the impact of a change in world interest rates is largest in EMENA and Latin America. These regression estimates are presented in Annex 1.

Now we turn to discussing simulation results of large-scale econometric models. Three types of multiplier exercises are performed using the CFM and MULTIMOD models. These simulations measure the impact of the following changes on developing countries' growth performance over a decade:

- 1 percentage point rise in industrial country growth, sustained over a decade;
- 100 basis point rise in world interest rates, sustained over a decade;
- a trade and finance policy package for developing countries (involving a doubling of foreign direct investment flows, and a combination of trade-related supply-side effects and a more liberal trading system leading to a 2 percentage points rise a year in the rate of growth of exports of developing countries, sustained over a decade).

The results of these simulations are presented in Table 2. There is a striking similarity between the simulation results of the CFM and those of the simple regression (naive) model of equation (1) for both the effects of a change in industrial country growth and world interest rates.

On the other hand, the magnitude of the effects as implied by the simulation results of MULTIMOD are somewhat different. The differences are due to two major properties of MULTIMOD which are absent in CFM. First, because MULTIMOD has forward-looking properties the effects of "multiplier" exercises (table 2) tend to be significantly different from those with backward-looking expectation particularly for financial prices. In MULTIMOD expectations adjust quickly to any change in policy variables. In CFM, on the other hand, expectations are adaptive, except for debt flows which can be forward-looking, and play only a minor role if any. Second, the construct of MULTIMOD allows interaction between the industrial and developing country groups, so there are some second-round (reverse casualty) effects for each of the "multiplier" exercises presented in table 2. Even though the reverse-casuality effects, from the developing country group to the industrial countries tend to be small over the longer-term, in the short-term and for individual industrial countries they could be significant.

Table 2. Impact of Changes in the International Economic Environment on Developing Countries' Economic Performance in the 1990s

	OECD growth up by 1 percent a/		LIBOR up by 100 basis points		Trade and private finance package b/	
	CFM	MULTIMOD	CFM	MULTIMOD	CFM	MULTIMOD
	average percentage deviations per year					
GDP growth						
Developing countries c/	0.7	0.5 (0.5)*	-0.2	-0.1 (-0.6)*	1.3	0.9 (0.6)*
Industrial countries	1.0	1.0 (1.3)*	...	-0.3 (-1.6)*	...	0.0 (0.3)*
Export growth						
Developing countries c/	0.8	1.5 (2.2)*	-0.2	-0.2 (-2.3)*	2.0	2.0
Industrial countries	...	1.1 (3.0)*	...	-0.3 (-2.9)*	...	0.1 (0.9)*
Interest rate						
Short-term interest rates in industrial countries	...	-1.1 (-2.1)*	1.0	1.0	...	-0.4

Source: Author's calculations.

* Figures in parenthesis show the effect in the first year of the simulation period (1991-2000).

a/ It should be noted that in MULTIMOD raising the long term growth of the industrial countries (for the purpose of generating the "multiplier" results for table 2) requires changing some of the policy levers in the model (i.e., taxes, money supplies, etc.). Thus, raising the industrial country group's growth by about 1 percentage point was brought about by raising the money supply. Thus, the growth "multiplier" results generated by MULTIMOD should be interpreted differently from those by CFM, which takes the rate of growth of industrial countries exogenously (see Annex 2).

b/ Higher world trade growth and higher level of FDI to the developing countries.

c/ In MULTIMOD, the developing country group is "net debtor countries" which is similar in its country classification to the developing countries in CFM.

One conclusion that may be drawn from the results presented in this section is: the effect of an increase in the rate of growth in the industrial countries on the rate of growth of developing countries as a group is unambiguously positive, but the magnitude of the impact depends crucially on the level of real international interest rates, which, in turn, depends on how the real and financial sectors and expectations are modelled. On the one hand, growing economic integration (e.g., as measured by the rise in the ratio of tradable goods and services to total output) may have increased the magnitude of the spillover effects of changes in the industrial countries' growth performance on the developing countries. On the other hand, the growing importance of financial links may have altered the eventual impact of growth impulses

emanating from the real side. The worst combination of external economic conditions for the developing countries (particularly those severely indebted) is a decline in the rate of growth of industrial countries with rising real international interest rates. Rising growth in the industrial countries with a declining real international interest rates provides the best combination of external conditions for growth in the developing countries. Starting in the 1980s, both recessions and recoveries in the industrial economies have resulted in either unchanging or even rising real interest rates internationally, the negative spill-over effects on the developing countries (as a group) have tended to be magnified while the positive spill-over effects have tended to be weakened. Nevertheless, the size of the impact may differ significantly from country to country as both the initial conditions and stance of domestic policies tends to vary considerably.

3. SOME OF THE KEY ECONOMIC ISSUES IN THE 1990s

The longer-term outlook for both the industrial countries and developing countries in the 1990s will be influenced significantly by the changes that may take place in international financial and trade flows as well as in international interest rates and oil prices. Yet, these are precisely the areas in which there is now a large degree of uncertainty -- perhaps more than any time since the early 1970s. The issues that are discussed briefly in this section are those that are formulated into scenarios and their possible impact on growth and development are quantified in section 4.

Financial Stress in Japan and the United States: Since the latter half of the 1980s industrial countries have experienced several episodes of financial instability which threatened economic growth. Most notable of these instabilities are the widespread failure of depository financial intermediaries (savings and loan institutions) in the United States, the worldwide stock market declines in 1987 and 1989, and the financial turbulence in Japan in 1990. At present (mid-1991), some of the biggest banks and insurance companies of the United States and Japan have been weakened significantly by a large number of defaults by the non-financial sectors, high interest rates, and falling share and real estate prices. The possibility of "contagion effects" presents a serious potential problem to the world economy in the 1990s.

The U.S. Fiscal Deficit, World Savings and Interest Rates: The U.S. current account balance swung from a $7 billion surplus in 1981 to a deficit of $162 billion in 1986. Since then the deficit has gradually declined but still hovers around $100 billion. It is estimated that this deficit has absorbed about 4 to 5 percent of total savings of the rest of the world per year since the mid-1980s.[5/] The ballooning of the U.S. current account deficit is linked with the sharp increase in the U.S. federal budget deficit.

As a result of a highly expansionary fiscal policy (lower tax rates and higher spending levels) in the U.S., the federal budget deficit climbed from 2.4 percent of GNP in 1981 to around 5 percent in the mid-1980s, before gradually declining to 3 percent in the late 1980s. These large fiscal deficits have been associated with the persistence of high real interest rates in the international capital markets. The U.S. budget deficit is expected to remain large over the next several years and thus may continue to exert upward pressure on world interest rates. If the U.S. budget deficits worsens, it could exacerbate the

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5/ The level of world savings (gross national savings) is estimated to be about $400 billion (around 20 percent of world GDP).

current fears concerning world capital shortage, which is taking place as the result of greater world demand for new capital relative to the world supply of savings. Both private and public savings in Japan are declining, Germany's current account surplus has fallen sharply as the process of unification increases investment demand, and the demand for capital is rising in Eastern Europe and (because of post-war reconstruction) the Middle East. These factors will lead to upward pressures on international interest rates that will moderate the pace of investment in both industrial and developing countries. This possibility poses a serious risk to the growth prospects of developing countries. A significant decline in the U.S. budget deficit could lower world interest rates, and lead to more investment and faster growth worldwide.

Volatility of Oil Prices: After a long period of relative stability, oil prices became highly volatile in the 1970s. The coefficient of variation[6/] of average monthly oil prices rose from 0.07 percent during the period of 1970-72, to 0.74 percent for the period 1973-80. Although, the extent of volatility of oil prices has declined in recent years (the coefficient of variation for 1981-90 period was 0.32), there have been several spikes such as those in 1987 and 1990. High and volatile oil prices in the period of 1973-80 led to economic slow-down, a sharp rise in inflation rates, lower productivity growth, and high unemployment worldwide. Although, for industrial countries as a group, oil consumption relative to economic activity fell by 40 percent between 1973 and 1988, their economies (and particularly those of oil importing developing countries) remain highly vulnerable to sharp increases in oil prices. Supply constraints in the industrial countries and the Soviet Union will make the Persian Gulf region the predominant supplier of oil by the mid-1990s. Therefore, oil prices, in the medium-term, will be influenced by political and security considerations in the Middle East even more than before. As long as the political conditions in that region remain unsettled, oil supplies will remain vulnerable and there could be episodes of sharp spikes in oil prices in the 1990s. On the other hand, close cooperation between the major oil producing and consuming countries could go a long way in preventing major disruptions of vital oil supplies and thereby disallowing sharp spikes in oil prices in the 1990s.

Protectionism and Regional Trade Blocs: Some of the recent trade initiatives have strong regional dimensions. There is a trend toward more concentration of trade flows within three major blocs -- North America, European community, and East Asia. As of the mid-1980s, trade within the bloc as a share of total trade was 69 percent in western Europe, 41 percent in North America, and 31 percent in East

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6/ Defined as the ratio of standard deviation to the mean value.

Asia. Do these developments signal a possible breakdown in the open trading system? The outcome will crucially depend on whether the Uruguay Round trade negotiations -- the first to include developing countries as active participants -- are successful or not. If these negotiations were to collapse, the risk of a trade war among the major regional groups would rise significantly. A rise in protectionism in the 1990s will be very costly to all countries, particularly the developing countries. It has been estimated that the removal of trade restrictions by the industrial countries against the developing countries could raise the latter's GDP level by 3 to 4 percent. The impact is probably significantly larger if the longer-term dynamic effects are also taken into account. Therefore, whether the 1990s will be a decade of substantial progress in liberalizing the world trading system or a period of intensified protectionism will be crucial factor in influencing investment and growth in the developing countries.

Productivity Growth: productivity growth is the single most important factor contributing to the impressive growth record of today's industrial economies during the last 100 years. These countries' ability to improve their standard of living over this period depended almost entirely on their impressive achievement in raising their output per man-hour.[7/] Growth in labor productivity accounts for more than two-thirds of growth in total GDP of the industrial countries in the 20th century. During this period, these countries raised their average standard of living by six-fold. Therefore, if one assumes that the main engine of growth for today's industrial countries has been the relentless progress in technology and advancement of knowledge, which are embodied in machines and people, then should we be concerned about prospects for growth and development over the 1990s? The answer is yes for several reasons. First, productivity growth in the industrial countries has slowed significantly since the early 1970s. There has been some recovery since the mid-1980s as investment-to-output ratios increased, but there is much uncertainty about sustainability of the resulting higher rates of productivity. Second, with population growth continuing to decline in most industrial countries and the cost of capital remaining high, the efficiency with which resources are used becomes even a more crucial factor in affecting standards of living in these countries in the 1990s than before. This means that economic reforms must continue and costly policy mistakes be avoided. Third, in a global context, there are large differences in productivity performance and the standard of living. Except for a few countries, such as Korea and Taiwan, and to some extent China, a large majority of developing countries are not catching up with the high income countries, and many are in fact falling behind. In contrast to industrial countries, much of the economic progress in most developing countries that has taken place over the last 40 to 50 years, has been due to

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7/ Maddison (1982, 89).

increases in the level of factor inputs (such as land, labor, and capital) in the production process. The level of physical capital and skilled labor, and their rate of accumulation have been the major constraints on development in these countries. With the strong possibility of scarcity of capital in the 1990s, there are only a few feasible ways left for most developing countries to resume rapid growth and to increase their level of standard of living. They should raise substantially their overall economic efficiency; and invest more heavily in human capital to make their labor force more productive. These will require fundamental economic reforms as well as structural changes. Since the rate of growth of labor force is expected to accelerate in most of the developing countries in the 1990s, a major challenge to these countries will be to create employment while attempting to raise productivity of both labor and capital.

4. MODEL BASED SCENARIOS FOR THE 1990s[8/]

In this section, we analyze quantitative implications of several global economic scenarios using the IMF's MULTIMOD (multi-region econometric model), and then compare and contrast the results with those from other models where possible. The scenarios presented here are intended to capture some of the main structural characteristics of several possible global outcomes (as discussed in Section 3) in the 1990s. Specifically, these scenarios address the following issues: (1) changes in industrial countries' financial and macroeconomic conditions, (2) changes in the global trade environment, (3) changes in the international oil market, and (4) the impact of changes in domestic policies of developing countries on their growth prospects under varying assumptions about the global economic environment.

Financial Stress Scenario for Japan and the U.S.

Given the financial fragility of the private sector in Japan and the U.S., serious financial stress in these two countries could have a large negative impact on their economies, and could produce extensive disruptions to international financial markets through "contagion effects". This scenario is constructed on the assumption that due to financial stress in the U.S. and Japan the risk premia on the borrowing rates in these two countries could rise substantially and that there will be higher demand for liquidity in both Japan and the U.S.[9/] Simulation results suggest that simultaneous financial stress in Japan and the U.S., characterized by much higher real interest rates and loss of confidence, leads to a collapse of private investment and consumption. These changes could push the two economies into a deep recession in 1991-92. The impact of the recession in the U.S. and Japan on developing countries is transmitted through lower demand for exports by industrial countries and higher real interest rates.

The main simulation results for this scenario are presented in Table 3. The results show that in the first year of recession the rate of growth of GNP drops by 2.9 percentage points in the U.S., 2.8 percentage points in Japan, 1.6 percentage points in all industrial countries, and 0.8 percentage points in the developing countries. However, there tends to be a quick and simultaneous recovery of growth in industrial countries and developing countries. This is mainly due to the rapid adjustment of inflation,

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8/ The simulations reported here were prepared in March 1991. Since actual data for 1991 were not available at that time the scenarios reported here reflect preliminary estimates from both the World Bank and IMF data sources.

9/ We assume that the risk premia in the U.S. and Japan rise from 2 percent in baseline to 6 percent in the scenario. We also assume 4 percent increase in these two countries' money supply target. Results of the simulation are only for illustration.

Table 3: Financial Stress Scenario for Japan and the U.S.: Effects over one decade

	U.S.	Japan	Developing countries	Industrial countries
Results for year 1	---------- percent ----------			
Real GNP growth				
Base	1.7	3.7	4.2	2.4
Scenario	-1.2	0.9	3.4	0.8
Real Investment growth				
Base	2.8	4.4	8.4	3.3
Scenario	-10.0	-2.0	5.1	-1.4
Real Imports Growth				
Base	5.7	4.6	4.3	4.8
Scenario	1.4	0.3	-0.4	2.9
Real Short-term Interest Rate				
Base	3.7	3.4	...	...
Scenario	6.4	6.1		
Deviations in year 10				
(Scenario minus Base case, bil. US$, 1980 prices and dollar exchange rate)				
Real GNP level	-68	-70	-16	-122
Real Investment level	-79	-77	-9	-132

Sources: MULTIMOD simulations.

adjustment of inflation, long-run interest, and exchange rates in both industrial and developing regions due to the forward-looking behavioral specifications in MULTIMOD. In spite of improved growth, GDP and investment levels never catch up with their base case levels. In fact, the simulation results indicate the real GNP level of the industrial countries as a group in the year 2000 is lower by about $122 billion (1980 $) than in the baseline.

A similar financial stress scenario for the U.S. was presented in a recent study by DRI. Oil prices were assumed to "top $50 per barrel" in early 1991 and remain at this level through the second quarter of 1991. In DRI, higher inflation and international interest rates would force U.S. monetary policy to be tighter than the baseline (DRI). Collapse in public confidence pushes the U.S. economy into recession

in 1991. Real GNP growth in the U.S. falls by about 3 percentage points in 1991, imports growth by 6 percentage points, and nominal interest rates rise by 150 basis points.[10/]

Permanent Decrease of U.S. Government Spending by 4 Percent of GNP

This scenario implies a contractionary fiscal policy in the United States in order to reduce the size of public dissavings. Government expenditure is assumed to fall by 4 percent of baseline GNP every year below that in the baseline, amounting to about 170 billion real 1980 dollars per year on average during the 1991-2000 period. As a result, the U.S. government budget deficit, which averages about 2.5 percent of GNP in the baseline, is eliminated by 1993. The elimination of the deficit causes real interest rates in the U.S. to fall by 100 basis points on average during the 1991-1995 period, compared with that in the baseline. In this scenario the deficit reappears in 1995, as tax revenues continue to fall due to declining output and tax rates.[11/] However, the deficit as a percentage of GNP remains well below that in the baseline, with unchanged tax rates. The rising government budget deficits after 1995 raise private sector savings, due to the assumption in MULTIMOD that the private sector has perfect foresight and expects increases in future tax rates (i.e. the so-called Barro-Ricardian effect). On the other hand, the U.S. export volume is steadily higher than baseline due to continuous depreciation of the effective exchange rate, which leads to export-led growth in the U.S.[12/]

The final important results of the simulation show that a major reduction in the U.S. budget deficit leads to significantly lower world interest rates and slightly higher financial flows to developing countries. Table 4 presents some of the simulation results. Although in 1991, output of both the industrial countries and developing countries declines significantly (1.3 and 0.9 percent respectively), they rise rapidly in the

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10/ DRI, Ten-year Projections, October 1990. The interest rate here is yield on a long-term government bond.

11/ In MULTIMOD, the default assumption is that tax rates are changed to prevent the stock of government bond from rising explosively relative to the baseline GNP level. However, the model could have been simulated also by permanently lowering the rate of bonds to GNP by 4%.

12/ In his recent paper, "Rx for America: Export-Led Growth," International Economic Insight, Jan/Feb 1991, C. Fred Bergsten concludes that export-led growth may be the only feasible strategy for the US in the 1990s, when neither fiscal nor monetary tools will be available.

Table 4: Decrease of U.S. Government Spending by 4% of GNP

	(Deviations from Baseline)		
United States	**Year 1**	**Year 2 - 5**	**Year 6 - 10**
Real GDP growth rate (percentage point)	-3.00	1.10	-0.12
Real GNP level (1980 $ billion)	-114	12	34
Gross private investment level (%)	3.40	4.63	2.86
Exports of goods and services level (%)	0.80	3.28	1.32
Imports of goods and services level (%)	-7.00	-3.83	-1.18
GNP deflator (percentage points)	-1.1	-0.3	-0.3
Short-term interest rate (basis points)	-40	-155	-4
Long-term real interest rate (basis points)	-110	-113	8
Nominal effective exchange rate (%)	-4.40	-3.45	-0.52
Developing Countries			
Real GDP growth rate (percentage point)	-0.90	0.30	-0.02
Real GDP level (1980 $ billion)	-26	1	9
Exports of goods and services level (%)	-2.60	-0.05	0.24
Imports of goods and services level (%)	-3.60	1.03	0.68
Net debt level ($ bil.)	2	3	5
Net debt/nominal GDP	-0.50	-0.33	0.02
All Industrial Countries			
Real GDP growth rate (percentage point)	-1.30	0.50	-0.10
Real GDP level (%)	-1.30	0.10	0.30

Sources: Authors' calculations, based on MULTIMOD simulations.

rest of the simulation period.[13/] The main reason for this economic recovery is the rise in investment and consumption due to lower interest rates. Nevertheless, based on these results the long-term effect of this U.S. fiscal shock on the growth of developing countries is small.

Oil Price Scenarios

In this section, several scenarios concerning different time paths of oil prices in the 1990s are presented. The volatility of oil prices and its longer-term effects on world output, interest rate, and inflation is analyzed. Specifically, two different time paths for the oil price, one volatile and one smooth, but with same average price, have been designed to illustrate the effects of volatility on the global economic conditions in the 1990s. In the high volatility case oil prices in the 1990s range between $20/bbl and $55/bbl. This scenario may represent future uncertainty about world oil prices if political and social instability in the Middle East were to continue. In contrast, the smooth time path of oil prices assumes consistently lower oil prices than in the baseline, ranging between $17/bbl and $24/bbl, possibly brought by a new political order in the Middle East and greater cooperation between oil producers and consumers. Under this scenario, real oil prices are assumed to be nearly constant.

Sharp changes in oil prices, whether up or down, could have disproportionately large effects on potential output in the industrial countries. As Bruno and Sachs (1985) show, a rise in the price of oil leads to a substitution away from oil towards capital, labor, and other imported inputs. Under the assumption of constant elasticity of substitution (CES) for the aggregate production function both real wage and capital stock will fall in the long run, as will the investment rate, and growth of technological progress and factor productivity. Consequently, output falls. Volatile oil prices cause volatile export and

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13/ According to Jeffrey A. Frankel, "Ambiguous Policy Multipliers in Theory and in Empirical Models," Chapter Two in Empirical Macroeconomics for Interdependent Economics, (ed. Bryant and others), Brookings Institute, Washington, D.C., 1988 (pp.17-26), a reduction in government spending leads to the decline in the level of real GNP, short-term interest rate, and inflation rates in the second year after the shock. He summarizes the simulation results from various models of a decrease in the U.S. government spending by 1 percent of GNP as follows:

	Real GNP (% deviation from baseline)	Short-term interest rates (percentage points)	Inflation rates (percentage points
DRI	-2.1	-1.6	-0.4
OECD	-1.1	-1.7	-0.6
Wharton	-1.4	-1.1	-0.3
Project LINK	-1.2	-0.2	-0.5

Table 5: Transmission of volatilities in oil prices, 1991 to 2000 (smooth oil price scenario minus volatile oil price scenario) 1/

Developing countries	Difference in level or growth rate	Difference in standard deviation
Real GDP growth rate (percentage point)	+0.28	-0.20
GNP deflator (percentage point)	-1.25	-3.70
Export price deflator (percentage point)	. .	-17.00
Import price deflator (percentage point)	-	-12.50
Price index of commodities	1.70	-1.30
Real GDP level in 2000 (1980 $ billion)	+111	...
Industrial countries		
Real GDP (growth rate)	+0.03	-0.53
Short-term interest rate (basis points)	-43	-33
GNP deflator (percentage point)	-0.56	-0.69
Real GDP level in 2000	+27	...

Source: Author's calculations from MULTIMOD simulation results.

1/ Model is simulated from 1991 to 2015.

import prices, and unstable interest, and output growth rates. Table 5 shows that the volatility of the world oil prices increases, so does the volatility in GDP growth, inflation, and interest rates.

Alternatively, we consider two other time paths of oil prices in order to better measure the impact of volatility (as opposed to the level effect). First, we assume that the two paths have the same average price of oil, about $27/bbl. Second, one price path is assumed to have a larger standard deviation ($2.3/bbl) than the other ($1.5/bbl). The simulation results indicate that volatility of oil prices have a significant impact on key macroeconomic variables even if the long-term average price of oil is held constant (see table 5a).

Finally, we consider a simple oil price shock scenario whose results can be compared to those in other models. In this scenario, the oil price is assumed to increase by $10. Government expenditure is held unchanged in real terms and monetary policy is assumed to be non-accommodating. The results from MULTIMOD simulations together with those from the OECD's INTERLINK model are presented in table 5b.

Table 5a. Effects of volatility of oil prices on the industrial countries (cumulative deviation of the 1990s) [1]	
GDP growth rate (percentage point)	0.4
Inflation rate (percentage point)	-0.5
Short-term interest rate (basis points)	-40
Real GNP level at 2000 (US$ bil. 1980 price)	38

Sources: Authors' calculation based on simulations of MULTIMOD.

[1] Smooth time path minus volatile time path of oil price.

Table 5b. Effects of a $10 oil price increase: alternative models
(deviation from baseline)

	MULTIMOD [1]			OECD (INTERLINK) [2]		
Industrial countries	1990	1991	1992	1990	1991	1992
Inflation rate [3] (percentage point)	0.4	0.0	0.0	0.21	0.89	0.19
Output level (%)	-0.4	-0.5	-0.4	-0.13	-0.97	-0.93
Interest rates	0.4	0.5	0.5	0.42	0.78	0.13
Current account balance ($ bil.)	-44.9	-47.9	-47.1	-10.89	-22.06	-7.91

Sources: Authors' calculation based on simulations of MULTIMOD, and OECD.

[1] In MULTIMOD, it assumed that government expenditure is unchanged in real terms.
[2] Assumed tighter fiscal policy in INTERLINK, nominal government expenditure unchanged.
[3] Absorption deflator in MULTIMOD and consumer prices in INTERLINK.

The simulation results of the two models are roughly similar: Inflation in industrial countries, output rates fall, interest rates rise, and their combined current account balance deteriorates. In general, however, MULTIMOD tends to produce larger short-term effects than the INTERLINK model. Price expectations adjust quickly in MULTIMOD because of its forward-looking properties. However, actual prices, such as wages, adjust gradually because of assumed price stickiness. For example, in MULTIMOD, the impact of this oil shock on inflation is twice as large as that produced by the OECD INTERLINK model in the first year after the shock. But the impact in MULTIMOD disappears quickly, while in the INTERLINK model inflation worsens further by a 0.9 percentage point in the second year after the shock.

A High Productivity Scenario for the World Economy

Under the high productivity scenario, industrial countries follow a policy mix of monetary expansion and fiscal contraction to lower interest rates and raise capacity output. The real interest rate is lowered on average by 200 basis points. Risk premia on the business borrowing rate is set to zero, compared with 2 percent in the base case. Oil prices are assumed to follow a smooth path as discussed above, implying no change in real terms throughout the 1990s. Total factor productivity in industrial countries is assumed to grow at about 3 percent per year.

Given the international economic environment, we construct two alternative scenarios for the developing countries. First, a trade and private finance package (similar to the one assumed in Section 2) is considered. We assume that the current GATT negotiation brings about a more liberal international trading system. Moreover, the level of direct foreign investment (DFI) flows to developing countries is assumed to increase by an average of about $28 billion in the 1990s, a doubling of the average level in the baseline. This, together with better domestic policies (i.e. a stable macroeconomic condition, liberal trade policy, market-oriented reforms, and human resource development), is assumed to yield a better supply response in the export sector of the developing countries and leads to an increase (about 2 percentage points) in the rate of growth of volume of exports supplied by the developing countries. In the second scenario, we assume that domestic policy reforms in the developing countries raise their national saving rate by about 1 percentage point above that in the baseline. This, in turn increases the rate of investment. Furthermore, we assume that the increased investment rate raises the growth rate of productivity in the developing countries as a group.

The high productivity case for the global economic environment with the augmented trade and finance package for developing countries leads to higher imports and investment in the developing

countries followed by a 1.3 percentage point increase in their average rate of GDP growth. In this case, DFI flows double from the base case, but domestic investment shows little change compared with the baseline. This would imply an improvement in productivity of investment (a decline in ICOR). On the other hand, the high case with better domestic policies in the developing countries leads to a significant increase in domestic investment. Gross domestic investment level is on average almost 15 percent higher than the base case level. Higher investment leads to higher export and imports. Additionally, the rate of growth of real GDP in the developing region is nearly 2 percentage points higher compared with the base case. (A more detailed result is presented in Annex 3.)

Table 6 exhibits period average deviations from the baseline for some key macroeconomic variables. Under the high productivity case (with no change in developing country policies), GNP growth in the industrial region increases by almost 1 percent per year. Due to the lower uncertainty (lower risk premia) and lower inflation, the investment to GNP ratio rises steadily from 20 percent in 1990 to 26 percent in 2000. The combination of "high" performance in the industrial region and lower world interest rates leads to a higher rate of growth in the developing countries as a group. A higher demand for imports by industrial countries and a higher level of financial flows to the developing countries increase flows to the developing countries increase the level of exports of the developing countries substantially. Under the high case scenario, the ratios of exports and imports to GDP of the developing countries are much higher than in the base case, indicating greater integration of the developing region into the world economy.

The simulation results of this high productivity scenario demonstrate that developing country domestic policies are crucial determinants of their long-term growth path. In our example, if developing countries followed better domestic policies, they would enjoy an additional 1.3 percentage points in economic growth per year, given the same external condition. Also implied by the simulations for the high case scenario (alternative 1 in table 6) is the superiority of non-debt-creating flows (DFI) to debt-creating, interest-sensitive flows to the developing countries.[14/]

[14/] The superiority holds even if profit remittances are high or rising. This is because DFI's profit remittances tend to be mainly pro-cyclical in nature, while interest payments arising from debt-creating flows tend to be counter-cyclical, particularly since the mid-1970s.

Table 6: High productivity simulations
(period average deviation from baseline)

Developing Countries	Year 1 - 5	Year 6 - 10	Year 1 - 10
Real GDP (growth rate)			
High case	0.46	0.58	0.52
High Alternative 1 [1]	1.12	1.46	1.29
High Alternative 2 [2]	2.38	1.32	1.85
GDP level (1980 $ billion)			
High case	53.5	128.6	91.1
High Alternative 1	121.7	418.7	270.2
High Alternative 2	257.3	689.6	473.4
Gross investment (%)			
High case	3.14	6.00	4.57
High Alternative 1	2.62	-2.3	0.16
High Alternative 2	7.72	15.02	11.37
Export of goods & services (%)			
High case	4.60	11 38	7.99
High Alternative 1	10.26	26.32	18.29
High Alternative 2	15.8	30.22	23.01
Imports of goods & services (%)			
High case	6.18	13.74	9.96
High Alternative 1	7.72	13.48	10.6
High Alternative 2	9.84	21.38	15.61
Industrial Countries			
Real GDP (growth rate)			
High case	0.74	1.04	0.89
High Alternative 1	0.82	0.78	0.8
High Alternative 2	0.84	1.12	0.98
GDP level (1980 $ billion)			
High case	314.3	893.2	603.8
High Alternative 1	352.6	834.0	593.0
High Alternative 2	369.2	943.0	656.0
Long-term real interest rate			
High case	-0.1	-1.42	-0.66
High Alternative 1	-0.3	-1.54	-0.92
High Alternative 2	-0.46	-1.8	-1.13

[1] Alternative 1 : High case in the industrial countries with higher world trade growth and higher level of FDI to the developing countries.

[2] Alternative 2 : High case in the industrial countries with better domestic policies in the developing countries.

A Low Productivity Scenario for the World Economy

Under the low productivity scenario, Japan and the U.S. are assumed to face a serious financial crisis with "contagion effects" that engulf other industrial countries: real interest rates are very high, indicating extreme uncertainty; risk premia on the business borrowing rate is twice that in the baseline; oil prices are assumed to be highly volatile reflecting continuing political problems in the Middle East; and total factor productivity growth in the industrial countries is, on average, 2 percent lower than in the baseline.

In this scenario, the industrial countries' average growth rate of real GDP declines by 0.9 percentage point per year, while their average inflation rate rises by 0.4 percentage point per year, from the baseline. As a group, the average growth rate of the developing countries fall by 0.4 percentage points per year compared with the baseline. Under the assumption that very little capital flows to the developing region (i.e. DFI falls to only half that of the baseline level) and that the collapse of GATT negotiations lowers the developing countries' rate of growth of real exports by about 2 percent annually compared with the baseline, the developing countries' average rate of growth of real GDP declines by 0 6 percentage point.

Under an alternative scenario, in addition to low productivity growth in the industrial countries, we assume wide-spread slippage of domestic policy reforms in the developing countries, where national savings and investment rates decline and lead to lower productivity growth in these countries as a group. Period average deviations from the baseline for some key macroeconomic variables can be found in Table 7 (Detailed simulation results are presented in Annex 3). In the industrial countries, volatile oil prices reduce output and raise inflation. High real interest rates, declining investment, deteriorating terms of trade, and weakening domestic demand result in a 1 percent drop in their average rate of growth of real GNP through the 1990s.[15/] The prolonged slowdown in industrial countries reduces the lending to developing countries by an average of 20 billion dollars per year. Both export and imports of the developing countries fall, and by 2000, the volume of exports are down by 12 percent, while the volume of imports are lowered by 16 percent compared with levels in the base case. Finally, the average growth rate of investment in the developing countries declines by about 1 percentage point per year compared to the baseline. As a region, developing countries experience a declining of GDP growth of 0.6 percentage point per year from the base case.

15/ In MULTIMOD oil serves as an input to production function and hence sharp changes in oil prices are modelled as supply-side shock.

Table 7: Low productivity scenario (period average deviation from baseline)

Developing Countries	Year 1 - 5	Year 6 - 10	Year 1 - 10
Real GDP (growth rate)			
Low case [1]	-0.52	-0.34	-0.43
Low Alternative 1 [2]	-0.7	-0.36	-0.53
Low Alternative 2 [3]	-1.88	-0 56	-1.27
Low Alternative 3 [4]	1.24	0.16	0.7
GDP level (1980 $ billion)			
Low case	-63.1	-138.8	-100.9
Low Alternative 1	-87.3	-175.7	-131.5
Low Alternative 2	-203.1	-436.3	-319.7
Low Alternative 3	116.2	291.3	203.8
Gross investment (%)			
Low case	-3.60	-6.00	-4.80
Low Alternative 1	-5.48	-6.92	-6.20
Low Alternative 2	-5.22	-10.8	-8.01
Low Alternative 3	0.02	1.08	0.55
Exports of goods and services (%)			
Low case	-5.5	-9.66	-7.58
Low Alternative 1	-7.7	-11.92	-9.81
Low Alternative 2	-14.38	-22.68	-18.53
Low Alternative 3	4.84	6.58	5.71
Imports of goods and services (%)			
Low case	-7.18	-12.96	-10.07
Low Alternative 1	-10.42	-15.64	-13.03
Low Alternative 2	-10.6	-19.62	-15.1
Low Alternative 3	-3.58	-5 90	-4.74
Industrial Countries			
Real GDP (growth rate)			
Low case	-0.96	-0.88	-0.92
Low Alternative 1	-1.0	-0.90	-0.95
Low Alternative 2	-1.1	-0.90	-1.0
GDP level (1980 $ billion)			
Low case	-382.1	-927.1	-654.6
Low Alternative 1	-388.1	-912.9	-650.5
Low Alternative 2	-419.2	-969.1	-694.1
Long-term real interest rate			
Low case	0.72	2.4	1.56
Low Alternative 1	0.74	2.38	1.56
Low Alternative 2	1.68	3.1	2.39

[1] Low productivity scenario for the industrial countries.
[2] (1) with decreasing FDI to LDCs and unfavorable GATT.
[3] (1) with poor domestic policies of the developing countries.
[4] (1) with good domestic policies of the developing countries.

Consequently, if these countries were to implement "good" domestic policies, raise productivity growth, and succeed in preventing private investment from falling, then their GDP growth rate as a group increases by 0.7 percentage point per year compared with the baseline (as opposed to a decline of 0.6 percentage point under the poor policies assumption), despite the deterioration in the international economic environment.

Interaction Between External Economic Environment and Domestic Policies

While there has been some research work on the nature of transmission of growth impulses from the industrial to developing countries, less attention has been paid to the issue of how the developing countries should choose an appropriate mix of domestic policies so that they can adjust quickly to various external shocks, while sustaining growth and investment.

Institutional performance is an important factor in determining a developing country's response to external shocks. The ability of countries to quickly adopt and implement effective domestic policies in response to a shock, such as the 1979-80 oil shock, is a measure of institutional efficacy. Countries such as Thailand and Indonesia that quickly adopted sound and credible domestic policies in the early 1980s were able to make gradual adjustments and avoid severe recession. On the other hand, countries such as Argentina and Brazil that lacked credible domestic policies and suffered from the debt overhang were engulfed in severe economic recession.

While in the preceding section we considered domestic policy alternatives for the developing countries (various global economic scenarios were combined with domestic policy mixes, ranging from "very good" to "poor" domestic policies), this part of the discussion sums up the relevant results from simulation of various scenarios presented above, focusing on the interaction between the external economic environment and domestic policies of the developing countries. Table 8 gives brief descriptions of policy assumptions and their implementation.

These numerical results tend to confirm the claim that while the developing countries' long-term economic prospects may be affected by major changes in the external conditions, they depend largely on the success or failure of their own policies. Table 9 presents a "multiplier matrix" for the developing countries, generated from the simulations of various combinations of external circumstances and internal policies. We find that when holding the external environment condition unchanged, better domestic policies improve the developing countries' average growth by about 1.2 percentage points per year. Also shown in the table are simulation results from the effects of "very good" domestic policies (with an

Table 8. Assumptions on external economic environment and the developing countries' domestic policies for the 1990s

	Low Case	Baseline	High Case
External economic conditions:	Serious financial crisis in U.S. and Japan; very high real interest rates reflecting extreme uncertainties; highly volatile oil prices due to continuing political problems in the Middle East; GATT negotiations collapse; very little capital flows to the developing region.	The financial stress in U.S. and Japan is gradually reduced; real interest rates fall and productivity improves gradually; GATT negotiations achieve modest success; oil prices rapidly return to pre-war levels and then are constant in real terms; low inflation rates in industrial countries and improved exchange rate stability.	Industrial countries follow a policy mix of monetary expansion and fiscal contraction to lower interest rates and raise capacity output; oil prices are lower than baseline and constant in real terms throughout the 1990s; GATT negotiation brings about a more liberal international trading system; more capital flows to the developing countries.
Domestic policies in the developing countries:	A large number of developing countries fail to implement extended reforms; excessive government spending; tariffs and nontariff barriers are increased; less human resource development.	Policy orientations aimed at stabilizing the economic and financial situation; most developing countries manage to implement intended policies.	Liberal trade policy; tariffs and nontariff barriers are removed; developing countries implement new policies to maintain political and economic stabilities while continuing the market-oriented reforms; new government programs for human resource development.
Implementation:	Compared with baseline, risk premia in the U.S. and Japan is twice as high; total factor productivity growth in the industrial countries is, on average, 2 percent lower; oil prices in the 1990s range between $20/bbl and $50/bbl; DFI to LDCs fall by half; growth of real exports of LDCs is 2 percent lower; savings to GDP ratio in developing countries as a group decreases, so does the investment; lower productivity growth in developing countries as a group.		Compared with baseline, real interest rate is lowered on average by 200 basis points; oil prices range between $17/bbl and $24/bbl; risk premia on the business borrowing rate in G-7 is set to zero; productivity growth is about 3 percent per year; DFI flows to developing countries is increased by an average of about US$30 billion in 1990s; growth of real exports of LDCs is 2 percent higher on average; higher productivity growth for developing countries.

Table 9: Impact of Alternative External Circumstances and Domestic Policies on Long-term GDP growth of Developing Countries, 1990s 1/
(percentage point deviation from the baseline*)

Domestic policies of developing countries	External economic environment		
	Low	**Base**	**High**
Better (very good)	0.7	1.23	1.9
Average (good)	-0.6	0	0.6
Poor	-1.3	-1.0	-0.5

Sources: Authors' calculations.

* Baseline is defined as good domestic policies and base scenario for the external economic environment.

1/ In MULTIMOD, the developing country bloc does not have policy variables explicitly modeled. Hence, to stimulate domestic policies in developing countries it is necessary to effect this through adjusting behavioral parameters of the model.

Table 9a: Impact of Alternative External Circumstances (FDI and world trade) on Long-term GDP growth of the Developing Countries, 1990s
(percentage point deviation from the baseline)

	External economic environment		
Domestic policies of developing countries	Low with: low FDI and protectionism	Base	High with: high FDI and less protectionism
Average (good)	-0.5	0	1.3

Sources: Authors' calculations.

increasing saving rate, higher investment rate, and faster productivity growth). These policies result in a higher average growth rate for the developing countries than when the external conditions alone are assumed to improve (higher DFI level and more liberal international trade system). In sum, given our assumptions concerning the domestic and external policies, our results indicate that the impact of domestic policies on long-term growth of developing countries seem to be about twice as large as those attributable to changes in external conditions when the stance of domestic policies are held fixed. There are, however, two major caveats which imply caution in interpreting the results and argue against generalization. First, these results tend to hold only on an aggregate basis as individual country situations differ considerably from one another (not only because of domestic policies but also, among other factors, due to differences in international linkages). Second, the results are obviously sensitive to the magnitude of change introduced in both the domestic policies and external environment. Nevertheless, the magnitude of policy shocks that have been implemented in the scenarios presented above are in line with the post war historical experience.

5. CONCLUSIONS

The simulation results presented in this paper point to two potentially important findings which we believe are relevant to analysis of the prospects of the developing economies in the 1990s. First, changes in the international economic environment have a significant effect on the developing countries' long-term economic growth. The main channels of transmission are international trade and finance. Historically, financial conditions have supported growth in the developing countries. When growth accelerated in the industrial countries international trade increased more rapidly and, because of a higher level of savings in the industrial countries, more financial resources became available for the developing countries. Thus, growth impulses from the real side of the world economy were reinforced by financial developments. During the periods of slump in the industrial countries, the growth retarding impulses from the real side were countered by a decline in real interest rates as the investment demand in the industrial countries, in a synchronized fashion, fell below the supply of savings in those countries. Thus to an extent, the real interest rate decline together with continuing financial flows to the developing countries cushioned the negative impact of the recession in the industrial countries on the developing countries. These inter-relations seem to have undergone a fundamental change in the 1980s as economic slowdowns in the industrial countries have taken place while real interest rates increased and supply of funds to the developing countries dried up.

On the other hand, during the periods of economic expansion in the industrial countries, higher growth of output and trade have taken place while real interest rates remained high. This is explained by the fact that recent expansions have been fueled mainly by sharp increases in investment demand (and, in some countries, through fiscal expansion), while private saving rates were declining and public sector dissaving remained large.

Secondly, based on our simulation results, the impact of changes in domestic policies of the developing countries on their long-term growth is substantially larger than the long-term effects of changes in the international economic environment. Although our results are tentative and need to be interpreted cautiously, a simple "rule of thumb" that emerges is that the magnitude of the effect of reasonable changes in domestic policies on long-term growth may be at least twice as large as those coming from reasonable changes in the external economic environment.

ANNEX 1

Annex 1.
Regression Analysis of External Determinants
of GDP Growth on the Developing Countries, 1966-88

	Intercept	GDP growth OECD	GDP growth g_OECD (-1)	Real world interest rate a/	Oil prices dummy b/	RHO c/	Statistics	
							$\bar{R}^2$	DW
All Low & Middle Income Countries	3.192	0.294	0 399	-0.182	-0 107			
	(4.33)	(1.69)	(2 44)	(-1.82)	(.13)		437	1.21
By Analytical Groups								
Oil Exporters	2.288	0.486	0 550	-0.571	-0 842	-0 477		
	(1.65)	(1.23)	(1.56)	(-3.3)	(-.50)	(-2.1)	.340	1 97
Oil Importers	3 266	0 333	0.379	-0.302	-0 335			
	(4.69)	(2.06)	(2 49)	(-3.24)	(- 43)		.570	2.10
By Geographic Groups								
Sub-Saharan Africa	1.954	0.015	0 455	-0.170	1 187			
	(1 04)	(033)	(1.09)	(-.67)	(566)		-.052	1.60
	1 985		0.461	-0.170	1 154			
	(1.26)		(1 29)	(-.69)	(627)		.006	1.60
excl. Nigeria	3.118		0.147	-0.120				
	(3.04)		(.659)	(-.75)			.006	2 01
East Asia	4.463		1.065	0.200	-4.961	.268		
	(2.77)		(2.79)	(741)	(-2.73)	(1.68)	.327	2.05
	5.036		1.101		-4.990	0.295		
	(3 55)		(2 93)		(-2.78)	(1.94)	.347	1.99
South Asia	6.144	-0.707	0 292	0.122	-4.732			
	(3.64)	(-1.78)	(.779)	(.534)	(-2.47)		127	2.02
EMENA	3.958	0 412	0 189	-0.471	-0 034			
	(4.16)	(1.84)	(.896)	(-3.65)	(- 032)		.457	2.01
	3.952	0.416	0 186	-0.471				
	(4.38)	(2.16)	(.991)	(-3.76)			.488	2.00
Latin America	0.933	0.808	0 540	-0.504	3.062			
	(.815)	(2.99)	(2 13)	(-3.24)	(2.36)		637	1.59
	1 504	0.511	0.777	-0.493				
	(1.20)	(1 92)	(2 99)	(-2.84)			.545	1.70

Note: Figures in parenthesis are t-statistics.
a/ One period lagged.
b/ Dummy is set to 1 for year 1974, 1979, and 1980, zero otherwise
c/ First order auto-correlation correction.

ANNEX 2

Brief Description of GEM/CFM and MULTIMOD Models

CFM (Capital Flows Model) is a model of debt, creditworthiness, and borrowing for about ninety countries in which import capacity of most deveioping countries is determined as a residual in their balance-of-payments identity. Creditworthiness indicators as well as domestically-imposed financing constraints play crucial roles in determining the levels of private and non-concessional official flows and debt services. GDP growth is affected through a reduced-form relationship with imports and investment. The model is not a full-linked system but is simply solved as a set of separate "small-country' models. CFM consists about 900 equations and is installed in the TROLL system.

GEM (Global Economic Model) is a 640 equation macroeconomic model covering the whole world economy, but focusing particularly on the seven major industrial countries. The model is authored by and maintained at NIESR in London. A copy of the model which is maintained at IEC, World Bank, is used to produce forecasts and analyze events and policy options in the world economy. GEM is divided into sixteen sectors. Each of the G7 country sectors contains around 60 variables covering individual components of demand, price indices, exchange rates and interest rates, trade and current account. The remaining sectors cover the other industrial countries, OPEC, Asia, Latin America, Africa, the Centrally Planned Economies and Miscellaneous developing countries. These sectors contain equations for trade volumes and prices, which depend on five commodity price indices.[1/]

IMF's MULTIMOD (Multi-Region Econometric Model) was designed to analyze the effects of industrial country policies on major macroeconomic variables, both in the developed and developing worlds. The model focuses on the transmission of policy effects and, to a limited extent, can be used to evaluate the spillover to developing countries. MULTIMOD includes G7 countries, the bloc of the smaller industrial countries, and the bloc for rest of the world, which is further divided into net creditor (mainly oil exporters) and net debtor developing countries. The forward-looking behavioral specification in MULTIMOD is one of its distinguishing features which allows quick adjustment of expected inflation, the interest rates, and the exchange rates in the industrial countries. Debt flows to the developing countries are determined by the expectation of their ability to pay and is conceptually similar to the CFM model in the area. The model was designed as a simulation model, hence, does not make unconditional or "baseline" forecasts.[2/]

1/ See National Institute Economic Review, February 1990, page 51.

2/ See "MULTIMOD Mark II: A Revised and Extended Model" by Paul Masson, Steven Symansky, and Guy Meredith, IMF Occasional Paper 71, July 1990.

ANNEX 3

Selected Simulation Results

Notations as shown in the following tables*:

(1) MULTIZ_GATTFDI - Scenario of high FDI and less protectionism.
(2) MULTIZ_DCHIGHS - Scenario of better domestic policies of developing countries.
(3) MULTIZ_DCLOWS - Scenario of poor domestic policies of developing countries.

* More detailed simulation results are available upon request.

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DSET MULTIZ_GATTFDI

Deviations of MULTIZ_GATTFDI from MULTIZ_CONTROL

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
All Industrial Countries											
National Income											
Real GDP (%)	0.0	0.3	0.4	0.5	0.6	0.5	0.6	0.6	0.7	0.7	0.7
Real GDP (growth rate)	0.0	0.3	0.0	0.1	0.1	-0.0	0.0	0.0	0.0	0.0	0.0
Real GNP (%)	0.0	0.3	0.4	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.8
Domestic demand (%)	0.0	0.4	0.6	0.8	1.1	1.3	1.5	1.7	1.9	2.1	2.3
Consumption expenditure (%)	0.0	0.3	0.5	0.8	1.1	1.3	1.6	1.9	2.1	2.4	2.6
Gross private investment (%)	0.0	1.2	1.5	1.7	1.9	2.1	2.3	2.6	2.8	3.1	3.3
Exports of goods and services (%)	0.0	0.9	0.8	1.1	1.2	1.0	1.1	1.1	1.2	1.1	1.2
Imports of goods and services (%)	0.0	1.3	1.8	2.5	3.1	3.7	4.4	5.1	5.8	6.5	7.2
Real GNP (80$b)	0.0	34.7	40.9	57.0	66.6	68.9	77.0	84.9	91.9	96.7	101.9
Real GDP (80$b)	0.0	33.7	39.7	55.5	64.1	65.0	71.7	78.1	83.7	87.3	91.3
Consumption expenditure (80$b)	0.0	17.5	34.7	56.3	77.0	96.6	117.7	140.3	164.1	188.5	213.7
Gross private investment (80$b)	0.0	27.3	33.8	40.1	47.1	55.4	62.9	70.6	78.9	87.5	95.3
Real net exports (80$b)	0.0	-11.2	-28.8	-40.9	-59.9	-87.1	-108.9	-132.8	-159.3	-188.7	-217.7
Real gov¥t expenditure (80$b)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Government											
Gen. gov¥t financial balance ($b)	-0.0	14.1	19.6	27.4	32.5	32.7	34.0	34.3	33.7	32.2	30.6
Gen. gov¥t financial balance/GNP (%)	-0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Government debt ($b)	-0.0	-61.4	-82.5	-115.5	-155.5	-195.5	-236.2	-275.0	-310.5	-341.5	-368.7
Government debt/GNP	-0.0	-0.1	-0.2	-0.4	-0.5	-0.6	-0.7	-0.7	-0.8	-0.8	-0.8
Money | Interest Rates											
Money supply (%)	0.0	-1.5	-1.6	-1.8	-2.0	-2.2	-2.4	-2.5	-2.5	-2.5	-2.4
Money supply (growth rate)	0.0	-1.7	-0.1	-0.1	-0.2	-0.3	-0.2	-0.1	-0.1	0.0	0.1
Money target (%)	-0.0	-1.5	-1.6	-1.8	-2.1	-2.4	-2.7	-2.9	-3.0	-2.9	-2.8
Short-term interest rate	0.0	-0.1	-0.1	-0.2	-0.3	-0.4	-0.5	-0.7	-0.8	-0.9	-1.0
Long-term interest rate	-0.0	-0.2	-0.3	-0.4	-0.6	-0.7	-0.8	-0.9	-1.0	-1.0	-1.0
Prices | Supply											
Absorption deflator (%)	0.0	-1.3	-1.5	-1.8	-2.1	-2.6	-2.9	-3.3	-3.7	-4.0	-4.3
Absorption deflator (inflation rate)	0.0	-1.3	-0.2	-0.3	-0.4	-0.4	-0.4	-0.4	-0.4	-0.3	-0.3
GNP deflator (%)	0.0	-1.2	-1.2	-1.3	-1.5	-1.7	-2.0	-2.2	-2.4	-2.6	-2.7
Export price deflator (%)	0.0	-1.3	-1.3	-1.4	-1.6	-1.9	-2.2	-2.4	-2.7	-2.9	-3.0
Import price deflator (%)	0.0	-1.9	-2.5	-3.3	-4.1	-5.1	-5.9	-6.7	-7.5	-8.3	9.0
Capacity utilization rate	0.0	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2
Long-term real interest rate	0.0	-0.1	-0.2	-0.2	-0.3	-0.3	-0.4	-0.6	-0.7	-0.8	-0.9
International Accounts											
Trade balance ($b)	-0.0	7.5	9.3	22.6	30.6	31.5	34.2	35.3	34.7	32.1	33.4
Current account balance ($b)	0.0	7.5	9.6	23.3	32.6	35.6	40.7	44.6	47.1	47.8	52.5
Net foreign assets ($b)	0.0	7.5	17.1	40.4	73.0	108.6	149.4	194.0	241.2	289.0	341.5
As a percent of nominal GNP											
Trade balance	-0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Current account balance	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2
Net foreign assets	0.0	0.0	0.1	0.2	0.3	0.4	0.6	0.7	0.8	0.9	1.0

DSET MULTIZ_GATTFDI

Deviations of MULTIZ_GATTFDI from MULTIZ_CONTROL

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Net Debtor Countries											
National Income											
Real GDP (%)	0.0	0.6	1.1	1.8	2.6	3.5	4.3	5.3	6.3	7.4	8.5
Real GDP (growth rate)	0.0	0.6	0.6	0.7	0.8	0.9	0.9	0.9	1.0	1.0	1.1
Domestic demand (%)	0.0	0.4	0.4	0.9	1.3	1.5	2.0	2.4	2.9	3.3	3.9
Consumption expenditure (%)	0.0	0.2	0.6	1.1	1.9	2.8	3.8	4.9	6.1	7.5	9.0
Gross investment (%)	0.0	0.9	0.0	0.3	-0.3	-1.6	-2.8	-4.2	-5.9	-7.9	-9.8
Exports of goods | services (%)	0.0	2.2	3.8	5.6	7.6	9.6	11.6	13.7	16.0	18.3	20.7
Imports of goods | services (%)	0.0	1.4	1.0	2.3	2.8	2.5	2.7	2.8	2.8	2.6	2.6
Real GDP (80$b)	0.0	18.1	37.1	62.7	94.2	132.6	170.8	213.4	261.0	313.8	372.3
Consumption expenditure (80$b)	0.0	4.4	13.5	27.8	47.5	73.3	103.1	138.0	178.5	224.9	277.8
Gross investment (80$b)	0.0	6.7	0.1	2.5	-2.7	-16.6	-28.9	-44.5	-64.2	-88.6	-113.6
Real net exports (80$b)	-0.0	7.9	24.4	33.0	49.3	74.6	94.1	116.2	141.3	170.1	198.5
Prices | Supply											
Absorption deflator (%)	0.0	-1.6	-2.2	-3.0	-3.9	-4.9	-5.9	-6.8	-7.7	-8.6	-9.4
Absorption deflator (inflation rate)	0.0	-1.7	-0.6	-0.8	-1.0	-1.1	-1.1	-1.0	-1.0	-1.0	0.9
GNP deflator (%)	0.0	-2.1	-3.2	-4.5	-6.0	-7.6	-9.0	-10.4	-11.7	-13.0	-14.2
Export price deflator (%)	0.0	-3.4	-5.7	-8.0	-10.2	-12.5	-14.6	-16.6	-18.5	-20.5	-22.4
Import price deflator (%)	0.0	-1.3	-1.4	-1.7	-2.0	-2.4	-2.8	-3.1	-3.5	-3.8	-4.0
International Accounts											
Trade balance ($b)	-0.0	-10.9	-14.8	-32.7	-45.1	-50.2	-58.0	-64.6	-69.8	-73.2	-81.6
Current account balance ($b)	-0.0	-10.9	-13.3	-29.1	-39.6	-43.4	-50.2	-56.0	-60.6	-63.8	-72.2
Net debt ($b)	0.0	-4.1	-8.2	-12.3	-16.5	-20.7	-24.9	-29.1	-32.2	-34.8	-37.0
Interest payments as a % of exports	-0.0	0.1	-0.0	-0.3	-0.4	-0.5	-0.6	-0.6	-0.6	-0.6	-0.6
As a percent of nominal GDP											
Trade balance	-0.0	-0.3	-0.3	-0.7	-0.8	-0.9	-0.9	-1.0	-1.0	-1.0	-1.0
Current account balance	-0.0	-0.3	-0.3	-0.6	-0.8	-0.8	-0.9	-0.9	-0.9	-0.9	-1.0
Net debt	-0.0	0.4	0.5	0.5	0.7	0.8	0.9	1.1	1.2	1.3	1.4
Nominal effective exchange rate (%)	0.0	1.0	1.1	1.2	1.4	1.6	1.8	2.0	2.1	2.1	2.0
Real effective exchange rate (%)	0.0	-0.4	-1.1	-1.9	-2.9	-3.8	-4.7	-5.6	-6.4	-7.2	-8.0
Net Creditor Countries											
Real GDP (%)	0.0	0.4	0.2	0.4	0.5	0.3	0.3	0.3	0.2	0.2	0.2
Real GDP (growth rate)	0.0	0.4	-0.2	0.2	0.0	-0.2	-0.0	-0.0	-0.0	-0.1	0.0
Domestic demand (%)	0.0	-0.4	-0.9	-1.4	-2.1	-2.7	-3.1	-3.5	-3.7	-3.8	-3.7
Exports of goods | services (%)	0.0	0.8	0.7	1.3	1.5	1.3	1.5	1.6	1.6	1.5	1.6
Imports of goods | services (%)	0.0	-0.7	-1.6	-2.7	-3.7	-4.7	-5.5	-6.0	-6.3	-6.4	-6.3
Export price deflator (%)	-0.0	-1.5	-1.9	-2.5	-3.1	-3.7	-4.4	-4.9	-5.4	-5.8	-6.2
Import price deflator (%)	0.0	-1.9	-2.7	-3.7	-4.8	-6.1	-7.4	-8.8	-10.2	-11.8	-13.4
Trade balance ($b)	-0.0	3.1	5.3	9.6	13.8	17.7	22.2	26.8	31.4	36.2	41.6
Current account balance ($b)	-0.0	3.1	4.9	8.6	12.5	16.6	21.6	27.0	32.6	38.3	44.8
Net foreign assets ($b)	-0.0	3.1	7.9	16.4	28.6	45.0	66.3	92.9	125.2	163.1	207.5
World Prices											
Price of oil	-0.0	-1.2	-1.2	-1.2	-1.4	-1.6	-1.8	-2.0	-2.2	-2.4	-2.5
Price index of commodities	0.0	-12.4	-23.3	-32.7	-41.0	-48.4	-53.8	-58.6	-62.9	-66.9	-70.4

DSET MULTIZ_DCHIGHS

Deviations of MULTIZ_DCHIGHS from MULTIZ_CONTROL

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
All Industrial Countries											
National Income											
Real GDP (%)	0.0	0.2	0.4	0.5	0.6	0.6	0.6	0.5	0.5	0.4	0.4
Real GDP (growth rate)	0.0	0.2	0.2	0.2	0.1	-0.0	-0.0	-0.1	-0.1	-0.0	-0.0
Real GNP (%)	0.0	0.2	0.4	0.5	0.6	0.6	0.6	0.5	0.4	0.3	0.3
Domestic demand (%)	0.0	0.8	1.2	1.6	1.8	1.9	1.9	1.9	1.9	1.8	1.9
Consumption expenditure (%)	0.0	0.5	1.1	1.6	1.9	2.2	2.3	2.3	2.2	2.2	2.2
Gross private investment (%)	0.0	2.2	2.7	2.9	2.9	2.8	2.6	2.5	2.4	2.4	2.5
Exports of goods and services (%)	0.0	-0.4	0.3	0.6	0.7	0.5	0.3	0.0	-0.2	-0.4	-0.5
Imports of goods and services (%)	0.0	1.8	3.5	4.5	5.1	5.4	5.4	5.2	5.1	5.0	5.0
Real GNP (80$b)	0.0	26.1	42.5	59.3	70.4	70.8	67.9	53.8	49.7	43.8	41.5
Real GDP (80$b)	0.0	25.7	43.4	61.7	74.1	75.7	74.1	66.5	59.2	55.3	55.3
Consumption expenditure (80$b)	0.0	33.2	69.8	105.7	135.7	156.3	167.5	172.0	173.9	176.0	180.4
Gross private investment (80$b)	0.0	49.0	72.5	70.7	73.7	74.0	70.7	67.8	67.5	69.6	73.0
Real net exports (80$b)	0.0	-56.5	-89.0	-114.8	-135.3	-154.6	-164.1	-173.3	-182.1	-190.3	-198.1
Real govt expenditure (80$b)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Government											
Gen. govt financial balance ($b)	-0.0	24.5	41.4	54.2	58.5	47.4	30.7	11.8	-5.1	-16.9	-22.7
Gen. govt financial balance/GNP (%)	-0.0	0.1	0.2	0.3	0.3	0.2	0.1	0.0	-0.0	-0.1	-0.1
Government debt ($b)	-0.0	-72.7	-114.4	-175.2	-244.3	-304.0	-344.3	-357.8	-346.9	-318.0	-278.8
Government debt/GNP	-0.0	-0.1	-0.3	-0.6	-0.8	-1.0	-1.1	-1.1	-1.0	-0.8	-0.6
Money | Interest Rates											
Money supply (%)	0.0	-1.5	-1.6	-1.4	-1.0	-0.7	-0.5	-0.4	-0.4	-0.4	-0.5
Money supply (growth rate)	0.0	-1.7	-0.1	0.2	0.4	0.3	0.3	0.1	-0.0	-0.1	-0.1
Money target (%)	-0.0	-1.2	-1.2	-1.2	-1.3	-1.4	-1.5	-1.5	-1.4	-1.3	-1.2
Short-term interest rate	0.0	-0.3	-0.7	-1.1	-1.2	-1.2	-1.0	0.8	-0.7	0.6	-0.6
Long-term interest rate	-0.0	-0.9	-1.0	-1.1	-1.0	-0.9	-0.7	0.6	-0.6	-0.6	-0.6
Prices | Supply											
Absorption deflator (%)	0.0	-1.6	-2.2	-2.5	-2.7	-2.9	-2.9	-2.9	-2.9	-2.9	-3.0
Absorption deflator (inflation rate)	0.0	-1.6	-0.5	-0.4	-0.2	-0.1	-0.0	0.0	0.0	0.0	0.0
GNP deflator (%)	0.0	-1.3	-1.5	-1.7	-1.8	-1.8	-1.8	-1.8	-1.8	-1.8	-1.9
Export price deflator (%)	0.0	-2.0	-2.4	-2.6	-2.7	-2.7	-2.7	-2.6	-2.6	-2.6	-2.6
Import price deflator (%)	0.0	-3.5	-4.8	-5.6	-6.1	-6.4	-6.4	-6.4	-6.4	-6.4	-6.4
Capacity utilization rate	0.0	0.2	0.3	0.4	0.4	0.3	0.2	0.1	0.0	0.0	-0.1
Long-term real interest rate	0.0	-0.7	-0.9	-1.0	-0.9	-0.8	-0.6	-0.5	-0.5	-0.5	-0.6
International Accounts											
Trade balance ($b)	-0.0	-20.6	-25.4	-30.0	-34.0	-40.4	-47.3	-56.7	-67.1	-78.0	-89.1
Current account balance ($b)	0.0	-20.6	-27.7	-35.1	-42.0	-51.1	-61.3	-74.3	-89.1	-105.2	-122.3
Net foreign assets ($b)	0.0	-20.6	-48.3	-83.4	-125.5	-176.6	-237.9	-312.2	-401.3	-506.6	-628.9
As a percent of nominal GNP											
Trade balance	-0.0	-0.1	-0.1	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.3	-0.3
Current account balance	0.0	-0.1	-0.2	-0.2	-0.2	-0.2	-0.3	-0.3	-0.3	-0.4	-0.4
Net foreign assets	0.0	-0.2	-0.3	-0.5	-0.6	-0.8	-1.0	-1.3	-1.5	-1.8	-2.1

DSET MULTIZ_DCHIGHS

Deviations of MULTIZ_DCHIGHS from MULTIZ_CONTROL

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Net Debtor Countries											
National Income											
Real GDP (%)	0.0	1.6	3.4	5.3	7.3	9.2	10.5	11.2	11.6	12.0	12.4
Real GDP (growth rate)	0.0	1.6	1.9	2.0	2.0	1.9	1.1	0.7	0.3	0.4	0.4
Domestic demand (%)	0.0	0.4	1.6	3.2	4.9	6.5	7.6	8.2	8.5	8.8	9.2
Consumption expenditure (%)	0.0	0.3	1.2	2.6	4.4	6.5	7.9	8.7	8.7	8.9	9.2
Gross investment (%)	0.0	0.8	3.0	4.9	6.0	6.4	6.6	7.1	8.0	8.7	9.2
Exports of goods | services (%)	0.0	4.4	8.4	11.7	14.2	15.8	16.8	17.3	17.8	18.0	18.0
Imports of goods | services (%)	0.0	-0.2	1.9	4.1	6.0	7.0	7.5	7.6	7.6	7.4	7.2
Real GDP (80$b)	0.0	49.1	110.9	185.5	267.1	354.6	411.6	453.2	480.5	510.3	542.8
Consumption expenditure (80$b)	0.0	6.7	27.2	62.7	111.7	171.4	216.6	243.9	252.2	265.6	283.4
Gross investment (80$b)	0.0	6.0	24.9	43.6	57.8	65.5	69.1	75.5	88.0	97.7	105.8
Real net exports (80$b)	-0.0	34.3	56.1	72.8	86.2	100.1	105.5	111.4	116.9	121.8	125.9
Prices | Supply											
Absorption deflator (%)	0.0	-8.3	-11.8	-13.6	-14.4	-14.8	-15.0	-15.1	-15.2	-15.4	-15.5
Absorption deflator (inflation rate)	0.0	-8.6	-4.0	-2.0	-1.0	0.5	0.3	0.1	-0.1	-0.1	-0.1
GNP deflator (%)	0.0	-9.3	-13.3	-15.4	-16.5	-17.1	-17.4	-17.5	-17.7	-17.8	-17.9
Export price deflator (%)	0.0	-6.9	-9.7	-11.4	-12.3	-13.0	-13.1	-13.2	-13.3	-13.4	-13.5
Import price deflator (%)	0.0	-2.6	-3.5	-4.1	-4.4	-4.5	-4.5	-4.4	-4.3	-4.3	-4.2
International Accounts											
Trade balance ($b)	-0.0	-1.1	-4.8	-8.9	-12.8	-14.0	-14.8	-13.1	-10.9	-9.1	-8.0
Current account balance ($b)	-0.0	-1.1	-2.0	-2.5	-3.1	-3.7	-5.2	-5.5	-5.6	-5.6	-5.7
Net debt ($b)	0.0	0.8	2.5	4.7	7.4	10.1	12.7	14.8	16.3	17.1	17.2
Interest payments as a % of exports	-0.0	0.4	-0.2	-0.9	-1.4	-1.5	-1.4	-1.2	-1.0	-0.8	-0.7
As a percent of nominal GDP											
Trade balance	-0.0	0.0	-0.0	-0.1	-0.2	-0.2	-0.2	0.1	-0.1	-0.0	-0.0
Current account balance	-0.0	-0.1	-0.1	-0.1	-0.1	-0.1	0.1	0.1	0.1	0.1	-0.1
Net debt	-0.0	2.7	3.5	3.6	3.2	2.8	2.7	2.5	2.5	2.4	2.4
Nominal effective exchange rate (%)	0.0	1.0	1.1	1.1	1.2	1.3	1.3	1.3	1.3	1.2	1.1
Real effective exchange rate (%)	0.0	-8.3	-12.7	-14.9	-16.0	-16.5	-16.7	-16.8	-16.9	-16.9	-17.0
Net Creditor Countries											
Real GDP (%)	0.0	-1.5	-1.5	-1.3	-1.0	-0.9	-0.9	-1.0	-1.1	-1.3	-1.4
Real GDP (growth rate)	0.0	-1.5	-0.0	0.2	0.3	0.1	0.0	-0.1	-0.1	-0.2	-0.2
Domestic demand (%)	0.0	-8.3	-10.7	-12.5	-13.7	-14.7	-15.2	-15.5	-15.9	-16.3	-16.7
Exports of goods | services (%)	0.0	0.2	1.1	2.0	2.7	3.0	3.2	3.3	3.2	3.2	3.1
Imports of goods | services (%)	0.0	-14.7	-19.9	-23.0	-24.7	-25.9	-26.5	-27.0	-27.4	-27.9	-28.4
Export price deflator (%)	-0.0	-4.9	-7.9	-9.2	-9.8	-9.9	-9.9	-9.8	-9.6	-9.5	-9.4
Import price deflator (%)	0.0	-3.1	-4.3	-5.0	-5.4	-5.6	-5.7	-5.7	-5.7	-5.7	-5.7
Trade balance ($b)	-0.0	20.0	28.3	36.3	43.6	49.9	55.6	61.0	66.6	72.6	79.3
Current account balance ($b)	-0.0	20.0	28.2	36.2	43.7	52.2	61.6	71.8	83.0	95.0	107.6
Net foreign assets ($b)	-0.0	20.0	48.1	84.0	127.3	179.0	240.0	311.4	394.1	488.8	596.2
World Prices											
Price of oil	-0.0	-1.3	-1.6	-1.7	-1.8	-1.9	-1.9	-1.9	-1.9	-1.9	-1.9
Price index of commodities	0.0	-1.4	-2.1	-2.9	-3.8	-4.9	-5.9	-6.8	-7.7	-8.3	-8.9

DSET MULTIZ_DCLOWS

Deviations of MULTIZ_DCLOWS from MULTIZ_CONTROL

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
All Industrial Countries											
National Income											
Real GDP (%)	0.0	-0.2	-0.3	-0.5	-0.6	-0.6	-0.6	-0.6	-0.5	-0.5	-0.5
Real GDP (growth rate)	0.0	-0.2	-0.1	-0.2	-0.1	-0.0	-0.0	0.0	0.1	0.0	0.0
Real GNP (%)	0.0	-0.2	-0.3	-0.4	-0.5	-0.5	-0.5	-0.4	-0.4	-0.3	-0.2
Domestic demand (%)	0.0	-0.8	-1.2	-1.6	-1.8	-2.0	-2.0	-2.0	-2.0	-2.0	-2.1
Consumption expenditure (%)	0.0	-0.5	-1.0	-1.5	-1.9	-2.2	-2.3	-2.4	-2.4	-2.4	-2.4
Gross private investment (%)	0.0	-2.2	-2.8	-3.1	-3.1	-3.1	-3.0	-2.8	-2.8	-2.8	-2.9
Exports of goods and services (%)	0.0	0.8	0.4	0.3	0.3	0.4	0.6	1.0	1.3	1.6	1.8
Imports of goods and services (%)	0.0	-1.6	-3.2	-4.0	-4.5	-4.7	-4.7	-4.5	-4.4	-4.3	-4.3
Real GNP (80$b)	0.0	-19.5	-32.9	-49.1	-61.0	-63.2	-62.4	-54.3	-44.9	-37.4	-33.1
Real GDP (80$b)	0.0	-19.0	-34.2	-53.1	-68.6	-74.5	-78.0	-74.1	-69.1	-66.2	-66.7
Consumption expenditure (80$b)	0.0	-31.4	-66.3	-102.1	-133.6	-156.8	-171.7	-179.6	-184.4	-189.3	-196.8
Gross private investment (80$b)	0.0	-49.4	-64.9	-75.3	-79.7	-81.6	-79.7	-77.8	-78.2	-81.1	-85.5
Real net exports (80$b)	0.0	61.8	97.0	124.3	144.7	163.9	173.3	183.3	193.5	204.2	215.5
Real govt expenditure (80$b)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Government											
Gen. govt financial balance ($b)	-0.0	-23.1	-41.0	-55.4	-61.3	-50.5	-33.2	-12.6	6.8	20.9	28.2
Gen. govt financial balance/GNP (%)	-0.0	-0.1	-0.2	-0.3	-0.3	-0.2	-0.1	-0.0	0.0	0.1	0.1
Government debt ($b)	-0.0	66.8	106.7	168.1	236.4	299.6	343.4	358.5	346.8	315.5	272.9
Government debt/GNP	-0.0	0.1	0.2	0.4	0.7	0.9	1.0	0.9	0.8	0.6	0.4
Money | Interest Rates											
Money supply (%)	0.0	1.6	1.7	1.6	1.2	0.9	0.6	0.4	0.4	0.5	0.5
Money supply (growth rate)	0.0	1.8	0.1	-0.2	-0.4	-0.3	-0.3	-0.2	-0.0	0.1	0.1
Money target (%)	-0.0	1.1	1.2	1.2	1.3	1.3	1.4	1.4	1.4	1.3	1.1
Short-term interest rate	0.0	0.4	0.8	1.2	1.4	1.4	1.2	1.0	0.9	0.8	0.8
Long-term interest rate	-0.0	1.0	1.2	1.2	1.2	1.1	0.9	0.8	0.8	0.8	0.8
Prices | Supply											
Absorption deflator (%)	0.0	1.7	2.4	2.9	3.1	3.3	3.4	3.4	3.5	3.5	3.6
Absorption deflator (inflation rate)	0.0	1.7	0.6	0.5	0.3	0.2	0.1	0.0	0.0	0.1	0.1
GNP deflator (%)	0.0	1.3	1.7	2.1	2.2	2.3	2.4	2.4	2.4	2.5	2.5
Export price deflator (%)	0.0	2.1	2.6	3.0	3.1	3.2	3.2	3.2	3.2	3.2	3.2
Import price deflator (%)	0.0	3.6	5.1	6.0	6.4	6.8	6.8	6.8	6.8	6.8	6.9
Capacity utilization rate	0.0	-0.1	-0.2	-0.3	-0.3	-0.3	-0.2	-0.1	-0.0	0.0	0.1
Long-term real interest rate	0.0	0.7	1.0	1.1	1.0	0.9	0.8	0.7	0.6	0.7	0.8
International Accounts											
Trade balance ($b)	-0.0	30.1	45.3	61.6	75.7	91.8	105.8	122.3	140.4	160.4	182.2
Current account balance ($b)	0.0	30.1	48.7	70.3	92.0	116.7	140.9	168.0	197.7	230.4	266.9
Net foreign assets ($b)	0.0	30.1	78.8	149.1	241.1	357.8	498.7	666.7	864.5	1094.9	1361.8
As a percent of nominal GNP											
Trade balance	-0.0	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5	0.5	0.6
Current account balance	0.0	0.2	0.3	0.4	0.4	0.5	0.6	0.6	0.7	0.8	0.8
Net foreign assets	0.0	0.2	0.5	0.8	1.2	1.6	2.1	2.6	3.1	3.6	4.2

DSET MULTIZ_DCLOWS

Deviations of MULTIZ_DCLOWS from MULTIZ_CONTROL

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Net Debtor Countries											
National Income											
Real GDP (%)	0.0	-1.5	-2.9	-4.3	-5.6	-6.8	-7.4	-7.8	-8.0	-8.3	-8.5
Real GDP (growth rate)	0.0	-1.5	-1.5	-1.5	-1.4	-1.3	-0.7	-0.4	-0.2	-0.3	-0.3
Domestic demand (%)	0.0	-0.4	-1.4	-2.6	-3.7	-4.7	-5.3	-5.7	-5.8	-6.0	-6.2
Consumption expenditure (%)	0.0	-0.5	-1.3	-2.5	-3.9	-5.4	-6.2	-6.3	-5.9	-5.8	-5.8
Gross investment (%)	0.0	-0.0	-1.5	-2.7	-3.2	-3.1	-3.2	-4.0	-5.5	-6.5	-7.2
Exports of goods | services (%)	0.0	-4.1	-7.4	-10.1	-11.9	-13.2	-13.8	-14.1	-14.2	-14.3	-14.2
Imports of goods | services (%)	0.0	0.4	-1.7	-3.9	-5.7	-6.7	-7.3	-7.3	-7.2	-6.9	-6.6
Real GDP (80$b)	0.0	-46.2	-9 .3	-150.8	-205.4	-260.8	-292.6	-316.1	-333.1	-352.0	-373.0
Consumption expenditure (80$b)	0.0	-10.6	-4 .1	-61.6	-99.4	-142.0	-167.9	-177.5	-172.0	-172.9	-179.1
Gross investment (80$b)	0.0	-0.3	-12.9	-24.1	-30.4	-31.0	-33.4	-42.6	-60.4	-73.1	-82.7
Real net exports (80$b)	-0.0	-32.8	-49.7	-60.1	-67.5	-75.9	-77.7	-80.9	-84.2	-87.5	-90.6
Prices | Supply											
Absorption deflator (%)	0.0	9.1	13.7	16.2	17.4	18.0	18.2	18.3	18.4	18.6	18.7
Absorption deflator (inflation rate)	0.0	9.4	4.4	2.3	1.0	0.5	0.2	0.1	0.1	0.1	0.1
GNP deflator (%)	0.0	10.3	15.5	18.5	19.9	20.7	21.1	21.2	21.4	21.6	21.8
Export price deflator (%)	0.0	7.4	10.5	12.3	13.2	13.9	14.0	14.0	14.1	14.2	14.4
Import price deflator (%)	0.0	2.5	3.5	4.1	4.4	4.6	4.5	4.4	4.4	4.3	4.3
International Accounts											
Trade balance ($b)	-0.0	1.4	5.4	9.6	13.5	14.5	15.3	13.7	11.7	9.9	8.7
Current account balance ($b)	-0.0	1.4	2.4	2.7	2.9	3.0	4.3	4.5	4.7	4.7	4.8
Net debt ($b)	0.0	-1.0	-3.2	-5.7	-8.3	-10.6	-12.5	-14.0	-14.9	-15.1	-14.5
Interest payments as a % of exports	-0.0	-0.4	0.2	1.0	1.6	1.7	1.7	1.5	1.3	1.1	1.0
As a percent of nominal GDP											
Trade balance	-0.0	-0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	-0.0
Current account balance	-0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0
Net debt	-0.0	-2.6	-3.3	-3.4	-3.2	-3.0	-2.9	-2.9	-2.8	-2.8	-2.8
Nominal effective exchange rate (%)	0.0	-0.9	-1.0	-1.0	-1.0	-1.1	-1.1	-1.1	-1.1	-1.0	-0.9
Real effective exchange rate (%)	0.0	8.3	12.7	14.9	15.9	16.3	16.4	16.5	16.5	16.5	16.5
Net Creditor Countries											
Real GDP (%)	0.0	2.0	2.6	2.8	2.9	3.0	3.1	3.4	3.6	4.0	4.3
Real GDP (growth rate)	0.0	2.1	0.6	0.2	0.0	0.1	0.1	0.2	0.3	0.3	0.3
Domestic demand (%)	0.0	11.0	16.0	20.3	23.3	25.9	27.0	28.0	29.0	30.0	31.2
Exports of goods | services (%)	0.0	-0.0	-0.9	-1.9	-2.6	-2.9	-3.2	-3.2	-3.1	-3.0	-3.0
Imports of goods | services (%)	0.0	19.6	29.7	37.2	41.9	45.5	47.1	48.6	50.0	51.5	53.2
Export price deflator (%)	-0.0	5.4	9.3	11.3	12.2	12.6	12.6	12.5	12.3	12.2	12.0
Import price deflator (%)	0.0	3.1	4.3	5.1	5.5	5.7	5.7	5.7	5.7	5.7	5.8
Trade balance ($b)	-0.0	-29.5	-48.3	-67.8	-85.2	-101.2	-113.7	-126.1	-139.3	-154.2	-171.0
Current account balance ($b)	-0.0	-29.5	-49.0	-70.8	-92.6	-116.4	-139.2	-163.2	-188.8	-216.8	-247.8
Net foreign assets ($b)	-0.0	-29.5	-78.4	-148.8	-240.9	-356.8	-495.4	-658.0	-846.4	-1062.8	-1310.2
World Prices											
Price of oil	-0.0	1.3	1.7	2.1	2.2	2.4	2.4	2.4	2.5	2.5	2.6
Price index of commodities	0.0	1.8	2.8	3.7	4.5	5.5	6.4	7.3	8.1	8.9	9.6

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